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Biogeographic considerations of the Opisthobranchia (Mollusca: Gastropoda) fauna from the Brazilian littoral and nearby areas*

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Abstract. The aim of this paper is to examine the biogeographical distribution of the littoral and sub-littoral opisthobranch gastropods from Brazil and nearby areas. On the basis of published literature and personal data, a zoogeographic study was undertaken and the Brazilian region was compared with the Caribbean and Argentinean regions. The Brazilian littoral has been divided into six zones, based in the oceanographic features established by Castro & Miranda (1998). 466 species belonging to the orders Cephalaspidea, Anaspidea, Sacoglossa, Notaspidea and Nudibranchia from the Caribbean to the Argentinean region were considered in this study. The number of opisthobranch species is highest in Caribbean areas. Along the Brazilian littoral, South Brazilian Bight is the region with highest richness, while Orinoco-Amapá and Amazon shelf are the areas with lower species numbers. The similarity analysis shows that some possible geographic barriers act to the distribution of the opisthobranchs. For each locality considered in the study, the percentage of species that extends northward is higher than southward.

Keywords. Brazil, Caribbean region, Argentinean region, biogeography, species list.

1. INTRODUCTION

Faunistic inventories give fundamental information for many basic and applied scientific disciplines, such as ecology and biogeography (Stork & Samways 1995). An essential tool to establish inventories is taxonomy, which supplies a reference system for the biodiversity (Bisby 1995). The level of faunistic and taxonomical knowledge from different regions varies considerably, which raises a problem for the accomplishment of biogeographic studies. Nevertheless, the elaboration of this type of studies offers insights into possible models of distribution of a taxonomic group throughout a more or less extensive area.

Opisthobranch gastropods are well represented in most marine habitats from equatorial to polar regions. Ernst and Eveline Marcus studied this group for more than thirty years in West Atlantic temperate and warmer waters. Recently, other authors have provided new contributions to the knowledge of the Brazilian opisthobranchs (Troncoso et al. 1998; García et al. 2002; García & Troncoso 2003, 2004; Padula & Absalão 2005; Pola et al. 2005; Domínguez et al. 2006 a, b; Valdés et al. 2006). The actual level of knowledge of the opisthobranchs from Brazilian and Caribbean regions (i.e. Marcus 1977; Marcus & Marcus 1967a; Thompson 1977, 1980; Espinosa & Ortea 2001; Rosenberg 2005; Valdés et al. 2006) permits some biogeographical considerations; however, future studies along some areas of Brazilian coast are necessary to obtain a more complete knowledge of this fauna. The work of Marcus and Marcus was focused around São Paulo and Rio de Janeiro areas. The necessity of more faunistic studies in Brazil is obvious when comparing the number of species cited along Brazilian coasts (280 species, after Marcus 1977) with, for example, the Iberian Peninsula (523 species, after Cervera et al. 2004).

Here, we present a study on the diversity of the Opisthobranchs along the Brazilian coasts, using as biogeographic areas the six zones defined by Castro & Miranda (1998). These Brazilian zones are also compared with Caribbean and Argentinean regions (i.e. Muniain 1997; Schrödl 1999; Rosenberg 2005).

2. MATERIAL AND METHODS

2.1. Biogeographical areas

This research was conducted by comparing littoral and sub-littoral Opisthobranch fauna from the Brazilian shores with those from the Caribbean and Argentinean biogeographic regions. Species checklists were compiled by combining data from bibliographical sources and personal observations (included in the references). The total number of species considered for this study is 466, belonging to the orders Cephalaspidea, Anaspidea, Sacoglossa, Notaspidea and Nudibranchia (Table 1).

In this paper, we adopted the six oceanographic zones defined in CASTRO & MIRANDA (1998) for Brazil (Fig. 1). The geographical limits and features of these areas are shown in Table 2.

Fig. 1. Limits of the areas considered along Brazilian coasts, based on CASTRO & MIRANDA (1998) and nearby zones based on BRIGGS (1974). The number of species considered for each region is indicated.

Within the Caribbean region we have considered the provinces defined in BRIGGS (1974) (Fig. 1):

CC-CR, extends from Cape Canaveral to Cabo Romano

CR-CRo, extends from Cape Romano to Cape Rojo

CRo-O, extends from Cape Rojo to the mouth of the Orinoco River

O-A, extends from Orinoco River to Amapá

ABC, Includes Aruba, Bonaire and Curaçao

WI West Indies (WI)

Bermudas Is (BER).

In addition, we consider the Argentinean region (ARG) between the borders of Brazil to Uruguay up to 43-44°S (Chubut).

2.2. Community analysis and measurement of biodiversity

In order to examine diversity within the opisthobranch communities, data by region were subjected to a multivariate analysis using the Bray Curtis similarity measure and non-metric Multidimensional Scaling Ordination (MDS).

The Bray-Curtis index (BRAY & CURTIS 1957) was chosen because it does not consider double absences in its calculations. The results were then graphically described using dendrograms with the UPGMA (unweighted pair-group methods using arithmetic averages) aggregation algorithm (SNEATH & SOKAL 1973). The ordination analyses were carried out by means of an MDS (non metric multidimensional scaling program) based on the similarity matrix between stations.

For two different station groups a requirement is to identify which species account for the observed assemblage difference (CLARKE & GORLEY, 2001). The SIMPER routine was used to identify taxa that greatly contributed to differentiate station groups. The software used was P.R.I.M.E.R. (Plymouth Routines in Multivariate Ecological Research) version 5.2.8. for Windows.

3. RESULTS

466 species of opisthobranchs were found to occur in the Western Atlantic Ocean from Cape Canaveral to the Argentinean province (the Atlantic Magellanic region is not included). Table 3 shows the number of species by order or suborder for each zoogeographic area. The number of

opisthobranch species for each area varies remarkably. WI (West Indies) has the highest number of species (250 species), although, in general, the number is also high in the Caribbean areas Cro-O and CC-CR. Along the Brazilian zones, the number of species is lower and there is also a notable difference between the different zones. SBB is the zone with the highest number of species while AS is the zone with the lowest number (122 and 12 species, respectively). The number of species from the Argentinean region (ARG) is moderately low.

3.1. Faunal affinities

The cluster analysis using the six Brazilian zones shows a first division in which AS separate from the remaining zones (Fig. 2A). A second division separates SBS, and finally, the rest of the areas splits into two groups; a group including the north-eastern Brazilian zones EBS and NBS, and the other including ACR and SBB. A two-dimensional representation of the analysis MDS shows this same grouping pattern (Fig. 2B).

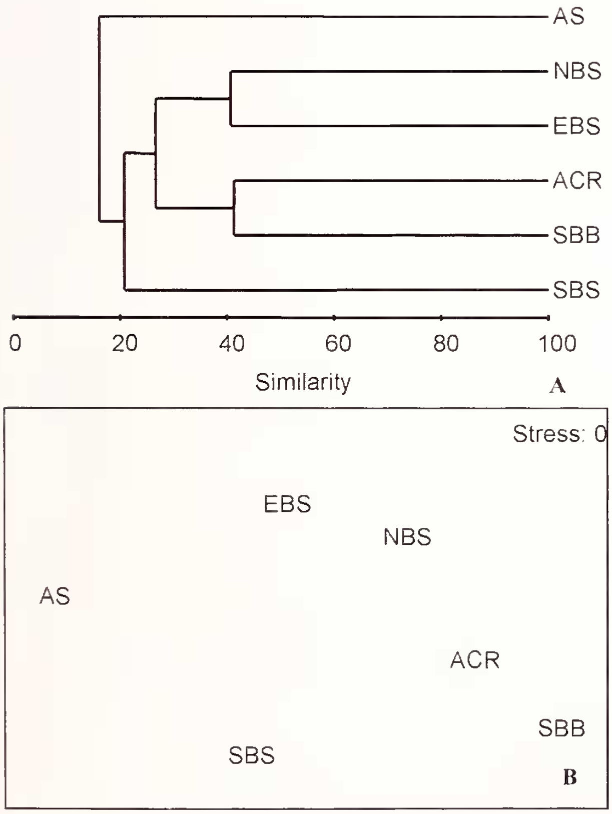


Fig. 2. Cluster classification (A) and MDS ordination (B) of the biogeographic areas based on the presence-absence of species in the areas from Brazil.

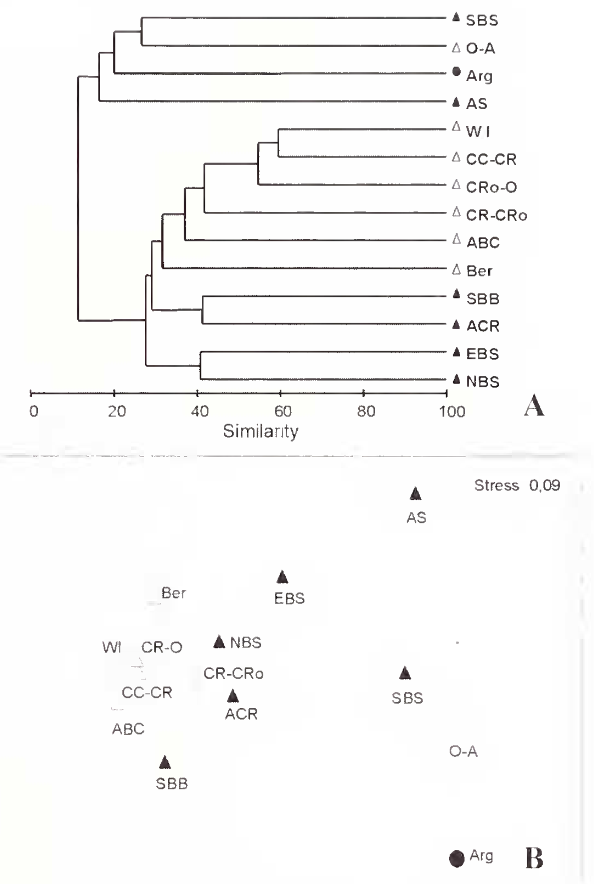


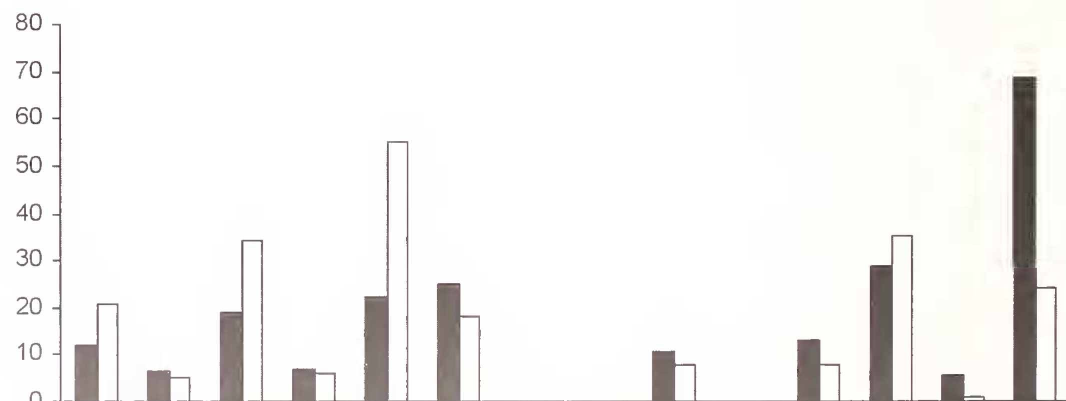
Fig. 2. Cluster classification (A) and MDS ordination (B) of the biogeographic areas based on the presence-absence of species in all areas included in this study. Black triangles, Brazilian regions; white triangles, Caribbean provinces; black circle, Argentinean region.

Including all geographical areas from Cape Canaveral and Bermudas to Chubut (Argentinean region), the cluster analysis and MDS show a first division in which Orinoco-Amapá (O-A), the Brazilian areas SBS and AS and the Argentinean region (ARG) separate from the remaining regions (Fig. 3). Those separate in two groups. One includes the north-eastern Brazilian zones EBS and NBS, while the other includes the remaining zones. The latter divides itself into two subgroups, one including the Brazilian regions SBB and ACR, and the other subgroup including all Caribbean provinces.

The SIMPER analysis identified four distinct groups. In group 1 (SBS, O-A, ARG, AS), the following taxa contribute to the similarity (up to 85%): Cephalaspidea (*Acteocina bidentata, Volvulella persimilis, Acteocina candei, Acteon pelecais*) and Notaspidea (*Pleurobranchaea inconspicua*). Group 2 (WI, CC-CR, CRo-O, CR-CRo, ABC, Ber) is mainly characterised by species of the orders Cephalaspidea (*Volvulella, Bulla, Haminoea, Hydatina, Micromelo*), Notaspidea (*Umbraculum, Pleurobranchus*), Anaspidea (*Stylocheilus, Bursatella, Aplysia, Bosellia*), Sacoglossa (*Cylindrobulla, Oxynoe, Tridachia, Elysia)* Dendronotacea (*Scyllaea*) and Nudibranchia (*Spurilla, Chromodoris*). Group 3 (SBB, ACR) is characterised by the presence of species of the order Nudibranchia, mainly Doridina (*Dendrodoris krebsii, Cadlina rumia, Tyrinna evelinae, Diaulula greeleyi, Discodoris evelinae, Chromodoris clenchi*), Arminina (*Armina*) and Acolidina (*Spurilla neapolitana, Phidiana lynceus, Flabellina engeli, Glaucus atlanticus*). Group 4 (EBS, NBS) is determined (up to a cumulative 90%) by the presence of the orders Nudibranchia (*Doto divae, Diaulula greeleyi*), Notaspidea (*Pleurobranchaea inconspicua, Umbraculum umbraculum, Berthellina quadridens*), Anaspidea (*Phyllaplysia engeli, Stylocheilus striatus, Aplysia dactylomela, Aplysia parvula, Bursatella leachii*), Saccoglossa (*Cylindrobulla beauii, Oxynoe antillarum, Elysia tuca*), and Cephalaspidea (*Philine sagra, Hydatina vesicaria, Micromelo undatus, Haminoea elegans, Chelidonura petra*)

In terms of dissimilarity, the species *Spurilla neapolitana, Scyllaea pelagica, Pleurobranchus areolatus, Tridachia crispata, Aplysia dactylomela, Aplysia fasciata, Oxynoe antillarum* contribute greatly to differentiate groups 1 and 2. Group 1 differed from group 3 due to *Phidiana lynceus, Spurilla neapolitana, Flabellina engeli, Facelina coenda, Anteaeolidiella indica, Berghia benteva, Taringa telopia, Tyrinna evelinae, Siraius ilo, Jorunna spazzola, Okenia zoobotryon, Hallaxa apefae, Doris verrucosa, Discodoris evelinae, Chromodoris neona, Dendrodoris krebsii, Diaulula greeleyi, Cadlina rumia, Chromodoris clenchi, Berthella agassizii, Berthella stellata, Aplysia dactylomela, Aplysia fasciata, Oxynoe antillarum, Ascobulla ulla, Navanax aenigmaticus.* Group 1 differed from group 4 due to *Doto divae, Diaulula greeleyi, Phyllaplysia engeli, Stylocheilus striatus, Berthellina quadridens, Aplysia dactylomela, Aplysia parvula, Oxynoe antillarum, Elysia tuca, Micromelo undatus, Chelidonura petra, Atys riiseanus*. Differences between group 2 and group 4 were mainly due to *Tridachia crispata, Aplysia fasciata, Chelidonura petra.* The group 2 differed from group 3 due to *Facelina coenda, Berghia benteva, Scyllaea pelagica, Siraius ilo, Hallaxa apefae, Chromodoris neona, Tridachia crispata, Philine mera, Cylindrobulla beauii, Acteon pelecais.* And finally the species *Phidiana lynceus, Flabellina engeli, Glaucus atlanticus, Facelina coenda, Armina muelleri, Anteaeolidiella indica, Berghia benteva, Doto divae, Taringa telopia, Tyrinna evelinae, Siraius ilo, Okenia zoobotryon, Hallaxa apefae, Chromodoris neona, Dendrodoris krebsii, Cadlina rumia* explained most of the dissimilarity between groups 3 and 4.

Figure 4 shows the number and percentage of endemic species for each biogeographic area. Those species considered as endemic have been cited only at one zoogeographic region from the area of study. Geographic distribution along other biogeographic regions was not considered for this study. The level of endemism varies notably along the different zoogeographic areas. The highest value was found in the Argentinean region (68.6%). This high value is due to a southward distribution to the Magellan region of the fauna from this area. The Brazilian zones



	CC-CR	CR-CRo	Cro-O	ABC	West Indies	Ber	O-A	AS	NBS	EBS	ACR	SBB	SBS	Arg
■ %	12,1	6,3	19,1	7,1	22	25	0	0	10,6	0	12,9	28,6	5,5	68,5
□ endemism	21	5	34	6	55	18	0	0	8	0	8	35	1	24

Fig. 4. Number and percentage of endemic species for each faunistic area.

have percentages between 0 % in Amazon Shelf (AS) and East Brazilian Shelf (EBS), and 28.7 % in South Brazilian Bight (SBB). Among the Caribbean provinces, the percentage of endemism varies between 7.1 %, at Aruba, Bonaire and Curaçao (ABC), and 22 % in the West Indian region.

Table 4 shows the percentage of species from each region present in other localities. The percentage is increasing, when extended northward, and decreasing, when extended southward.

4. DISCUSSION

An aspect to be considered in this study is that the data on species distribution and the level of knowledge of the communities vary across the geographical regions. Thus, the results presented here must be considered as tentative.

The number of opisthobranch species between biogeographic areas varies remarkably being higher in the Caribbean: West Indies (WI: 250 species), Cape Rojo-Orinoco (CRo-O: 178) and Cape Canaveral-Cape Romano (CC-CR: 173). The south Brazilian Bight (SBB) is the zone in Brazil with the highest richness (122 species), followed by the north Brazilian Shelf (NBS: 75) and the Abrolhos-Campos Region (ACR: 62). The areas with the lowest species richness are Oricono-Amapá (O-A) and Amazon Shelf (AS), both with 12 species, followed by South Brazilian Shelf (SBS) with 18 species. This could be related to oceanographic conditions, such as the effect of the Amazon River in the AS zone, and with a difference in sampling effort; the south Brazilian Bight is the zone where Ernst and Eveline Marcus did many of their collections.

The first division observed in the similarity analysis includes four geographical regions with features that seem to act as barriers to the distribution of opisthobranchs. The coasts from Orinoco-Amapá and Amazon Shelf are influenced by the Amazon and Orinoco rivers whose plumes spread north-westward for more than 1,000 km into the North Atlantic (Castro & Miranda 1998). These areas are characterised by soft bottom, turbid waters and freshwater runoff and they have been recognised as barriers to the dispersal of corals (Cox & Moore 2000), rocky shore gastropods (Vermeij 1978) and shallow water reef fishes (Gilbert 1972). The scarce opisthobranch fauna from Orinoco-Amapá and Amazon Shelf and the composition of species present in these areas are likely related to environmental characteristics of the region. Species present in these areas are generally cephalaspideans and arminacean, which frequently live in sand or mud.

A similar situation is found on the South Brazilian Shelf, where the low species numbers may be related to the effect of the Patos Lagoon River plume with an annual mean discharge of about 2000 m^3s^{-1} (Marques et al. 2006). This area is influenced during the winter by Subantarctic water.

The coastal area of the Argentinean biogeographic province is a transition zone characterised by processes of mixing and instability of the water masses. This province includes geographical features like the Rio de la Plata. The estuaries influence the primary and secondary production in the area and consequently, the distribution of species. Moreover, there is an interaction off the coast between the Malvinas current flowing on the slope from the south with cold Subantarctic waters rich in nutrients and the Brazilian current, with temperatures higher than 20° C and salinity over 36.0 ppt. This determines the presence of eurythermal and euryhaline species (Boschi 2000). The fauna of opisthobranchs is formed mainly by nudibranchs, which have their northern distribution limit at the border between the Argentinean region and the South Brazilian Shelf, extending southwards to Subantarctic regions.

Cluster analyses show two Brazilian groups, composed of NBS-EBS and ACR-SBB. In general, these groups coincide geographically with those indicated by Floeter et al. (2001) to the reef-fish fauna of the Brazilian coast. These authors considered several regions like the South and South-eastern coastal reefs, from the Guarapari islands to Santa Catarina (areas included in our analysis as the group ACR-SBB), and the North-eastern coast, extending from the Manuel Luis reefs to Abrolhos Archipelago (areas included in our analysis as the group NBS-EBS).

The southern and south-eastern coastal reefs, cited by Floeter et al. (2001) show lower mean annual water temperature, relatively higher primary production and a large shelf width. The reef-fish fauna living in this area appears to be the richest of Brazil, due to the mix of tropical and subtropical elements. The area is subjected to a relatively intense seasonal upwelling promoted by the South Atlantic Central Water, bringing low-temperature (<18°C) and nutrient-rich waters close to the coastline (Ekau & Knoppers 1999). Floeter et al. (2001) stated that a considerable number of Caribbean reef fishes found in this region are absent from the north-eastern sites. We found a similar pattern in opisthobranchs. The cluster analysis groups ACR-SBB closer to the Caribbean provinces than to other Brazilian zones. On the other hand, ACR and SBB are the Brazilian areas with the highest richness in opisthobranchs. This could be related with environmental features (as is observed for reef-fishes; Floeter et al. 2001). Nevertheless, in addition to environmental factors, differences in the richness of opisthobranchs for each area may depend upon other factors, such as discrepancies in sampling effort. The fauna from Brazil is better known in the South Brazilian Bight and Abrolhos-Campos zone, where Eveline and Ernst Marcus conducted research for over 30 years.

The north-eastern region as is described by FLOETER et al. (2001) for fishes, which nearly overlap with the group NBS-EBS, is characterised by its relatively warm waters, a weak seasonal signal and a small vertical temperature gradient; the circulation is influenced northward by the North Brazilian Current, and southward by the Brazilian Current (CASTRO & MIRANDA 1998). The reef formation consists of coralline algal crusts over a rocky substrate, hermatypic and fire corals, as well as sponges (FLOETER et al. 2001). The narrow and open shelf is an oligotrophic system almost entirely covered by carbonate sediments due to little freshwater input and the coast is influenced by the South Equatorial Current (KNOPPERS et al. 1999). In these areas herbivorous Sacoglossa and Anaspidea are more abundant. This trend of an increase in abundance in herbivores towards the tropical zone was previously observed in the Brazilian reef fishes (FERREIRA et al. 2004).

With regard to the distribution of opisthobranch species, it can be noted that for each locality considered in this study, the percentage of species that extend northward is higher than southward. Several authors discussed the Southern Caribbean as a centre of origin of species (see BRIGGS 2006) from which the species have been penetrating northward into Florida and Bermudas and southward into Brazilian waters (ROCHA 2003). Concerning Opisthobranchia, more intensive faunistic studies along the South American Atlantic coast are needed, before this hypothesis can be applied to understand opisthobranch diversity in that region.

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Table 1. Species checklists and geographical distribution.

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Acteocina atrata Mikkelsen & Mikkelsen, 1984	+	+	0	0	0	+	0	0	0	0	0	0	0	0
Acteocina bermudensis (Vanatta, 1901)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Acteocina bidentata (d'Orbigny, 1841)	+	+	+	+	0	+	0	+	+	+	+	+	+	+
Acteocina bullata (Kiener, 1834)	+	+	+	0	0	+	+	+	0	0	+	0	0	0
Acteocina canaliculata (Say, 1826)	+	+	+	0	0	0	0	0	0	0	0	0	0	0
Acteocina candei (d'Orbigny, 1841)	+	+	+	+	0	+	+	+	+	0	+	+	+	+
Acteocina decurrens (Verrill & Bush, 1900)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Acteocina inconspicua Olsson & McGinty, 1958	+	+	+	0	+	+	0	0	0	0	0	0	0	0
Acteocina kristenseni Jong & Coomans, 1988	0	0	0	0	+	0	0	0	0	0	0	0	0	0
Acteocina lepta Woodring, 1928	+	+	+	0	0	+	+	0	0	0	0	0	0	0
Acteocina liratispira (E. A. Smith, 1872)	0	0	0	0	0	0	0	+	0	0	+	0	0	0
Acteocina parviplica (Dall, 1894)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Acteocina perplicata (Dall, 1889)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Acteocina recta (d'Orbigny, 1841)	+	+	+	0	0	+	0	0	0	+	0	0	0	0
Acteon biplicatus (Strebel, 1908)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Acteon candens Rehder, 1939	+	+	+	0	0	+	0	0	0	0	+	0	0	0
Acteon danaida Dall, 1881	+	0	0	0	0	0	0	0	+	0	0	0	0	0
Acteon delicatus Dall, 1889	0	+	0	0	0	+	0	0	0	0	0	0	0	0
Acteon exiguus Mörch, 1875	0	0	+	+	0	+	0	0	0	0	0	0	0	0
Acteon finlayi McGinty, 1955	+	0	+	0	0	+	0	0	0	0	0	0	0	0
Acteon incisus Dall, 1881	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Acteon melampoides Dall, 1881	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Acteon pelecais Marcus, 1972	0	0	0	0	0	0	0	+	+	0	+	+	+	0
Acteon perforatus Dall, 1881	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Acteon splendidulus Mörch, 1875	0	0	0	+	+	+	0	0	0	0	0	0	0	0
Acteon vagabundus (Mabille & Rocgebrune, 1885)	0	0	0	0	0	0	0	0	+	0	0	0	0	0
Aglaja felis Marcus & Marcus, 1970	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Aglaja hummelincki Marcus & Marcus, 1970	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Aglaja quinza Marcus, 1979	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Aglaja unsa Marcus & Marcus, 1969	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Atys alayoi Espinosa & Ortea, 2004	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Atys caribaeus (d'Orbigny, 1841)	+	+	+	0	0	+	0	0	+	0	0	0	0	0
Atys guildingi Sowerby II, 1869	0	0	+	0	0	+	0	0	+	0	0	0	0	0
Atys macandrewii E. A. Smith, 1872	0	+	+	0	+	+	0	0	+	0	0	0	0	0
Atys riiseanus Mörch, 1875	+	0	+	0	+	+	0	0	+	+	+	0	0	0
Atys sandersoni Dall, 1881	+	+	+	0	0	+	0	0	+	0	0	+	0	0
Atys sharpi Vanatta, 1901	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Bulla bermudae Verrill & Bush, 1900	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Bulla eburneola (Dall, 1927)	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla krebsii Dall, 1889	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Bulla nux Menke, 1853	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Bulla perstriata Menke, 1853	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Bulla pinguicula Seguenza, 1879	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Bulla solida Gmelin, 1791	+	+	+	0	0	+	0	0	0	0	0	0	0	0

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Bulla striata Bruguière, 1792	+	+	+	0	+	+	+	0	+	0	+	+	+	0
Bullina exquisita McGinty, 1955	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Bullina torrei (Aguayo & Rehder, 1936)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Chelidonura berolina Marcus & Marcus, 1970	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Chelidonura cubana Ortea & Martínez, 1997	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Chelidonura hirundinina (Quoy & Gaimard, 1833)	+	0	0	0	+	+	0	0	0	0	0	0	0	0
Chelidonura hummelincki Marcus & Marcus, 1970	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Chelidonura juancarlosi Ortea & Espinosa, 1998	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Chelidonura mariagordae Ortea, Espinosa & Moro, 2004	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Chelidonura petra Marcus, 1976	0	0	0	0	0	+	0	0	+	+	0	0	0	0
Chelidonura sabina Marcus & Marcus, 1970	+	+	0	0	+	0	0	0	0	0	0	0	0	0
Crenilabium exile (Jeffreys, 1870)	+	0	+	0	0	0	0	0	0	0	0	0	0	0
Cylichna alba (Brown, 1827)	0	0	0	0	0	0	0	0	+	0	0	0	0	0
Cylichna auberii (d'Orbigny, 1841)	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Cylichna discus Watson, 1883	0	0	0	0	0	+	0	0	+	0	0	0	+	0
Cylichna eburnea A. E. Verrill, 1885	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Cylichna georgiana (Strebel, 1908)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Cylichna krebsii Mörch, 1875	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Cylichna verrillii Dall, 1889	+	0	0	0	0	0	0	0	0	0	0	0	+	0
Cylichna vortex (Dall, 1881)	+	+	0	0	0	0	0	0	0	0	0	0	0	0
Cylindrobulla beauii P. Fischer, 1857	+	+	+	0	+	+	+	+	+	+	0	0	0	0
Cylindrobulla gigas Mikkelsen, 1998	+	+	+	0	0	+	+	0	0	0	0	0	0	0
Diaphana caribaea Espinosa, Ortea & Fernández-Garcés, 2001	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Diaphana seguenzae (Watson, 1886)	0	0	0	0	0	0	0	0	+	0	0	0	0	0
Gastropteron chacmol Gosliner, 1989	+	+	+	0	0	+	0	0	0	0	0	+	0	0
Gastropteron hamanni Gosliner, 1989	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Gastropteron rubrum (Rafinesque, 1814)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Gastropteron vespertilium Gosliner & Armes, 1984	0	+	0	0	0	0	0	0	0	0	0	0	0	0
Haminoea antillarum (d'Orbigny, 1841)	+	+	+	0	0	+	+	0	+	0	0	0	0	0
Haminoea elegans (Gray, 1825)	+	+	+	0	+	+	+	0	+	+	+	+	+	0
Haminoea glabra (A. Adams, 1850)	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Haminoea petitii (d'Orbigny, 1841)	0	+	+	0	+	+	0	0	+	0	0	0	0	0
Haminoea solitaria (Say, 1822)	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Haminoea succinea (Conrad, 1846)	+	+	+	0	0	+	+	0	0	0	0	0	0	0
Hydatina vesicaria (Lightfoot, 1786)	+	+	+	+	0	+	+	0	+	+	0	0	0	0
Japonacteon pusillus (Forbes, 1844)	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromelo undatus (Bruguière, 1792)	+	0	+	0	+	+	+	0	+	+	0	0	0	0
Mysouffa cumingii (A. Adams, 1855)	+	0	0	0	0	0	0	0	0	+	+	+	+	0
Mysouffa turrita (Watson, 1883)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Navanax aenigmaticus (Bergh, 1893)	+	0	+	0	+	+	0	0	0	0	+	+	0	0
Navanax orbygnianus (Rochebrunne, 1881)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Ovulactaeon meekii Dall, 1889	0	0	0	0	0	+	0	0	+	0	0	0	0	0
Philine alba Mattox, 1958	0	0	+	0	0	0	0	0	0	0	0	0	+	0
Philine argentina Carcelles, 1947	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Philine caballeri Ortea, Espinosa & Moro, 2001	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Philine candeana (d'Orbigny, 1841)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Philine falklandica A. W. B. Powell, 1951	0	0	0	0	0	0	0	0	0	0	0	0	+	0

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Philine finmarchica M. Sars, 1859	0	0	0	+	0	+	0	0	0	0	0	0	0	0
Philine flexuosa M. Sars, 1870	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Philine infundibulum Dall, 1889	0	0	+	0	0	+	0	+	0	0	0	0	0	0
Philine mera Marcus & Marcus, 1969	0	0	0	0	0	0	0	0	0	0	+	+	+	0
Philine planata Dall, 1889	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Philine sagra (d'Orbigny, 1841)	+	0	+	0	0	+	0	+	+	+	0	0	0	0
Philine thurmanni Marcus & Marcus, 1969	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Philine trachyostraca Watson, 1897	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Philinopsis aeci Ortea & Espinosa, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Philinopsis pusa (Marcus & Marcus, 1966)	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Pluscula cuica Marcus, 1953	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Pyrunculus caelatus (Bush, 1885)	+	+	+	+	0	+	0	0	0	0	0	+	0	+
Pyrunculus obesiusculus (Brugnone, 1877)	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Pyrunculus ovatus (Jeffreys, 1871)	+	0	0	0	0	+	0	0	+	0	0	0	0	0
Retusa canaliculata Wells & Wells, 1962	0	0	0	0	0	0	0	0	+	0	0	+	0	0
Retusa domita (Dall, 1889)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Retusa frielei (Dall, 1881)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Retusa omphalis Mörch, 1875	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Retusa pervia (Dall, 1889)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Retusa sosa Marcus & Marcus, 1969	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Retusa spatha (Watson, 1883)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Retusa sulcata (d'Orbigny, 1841)	+	+	+	0	0	+	0	0	0	0	0	0	0	0
Rictaxis punctostriatus (C. B. Adams, 1840)	+	+	+	0	0	+	+	0	0	0	0	0	0	0
Ringicula nitida A. E. Verrill, 1872	0	+	0	0	0	+	+	0	0	0	0	0	0	0
Ringicula semistriata d'Orbigny, 1842	+	+	+	0	0	+	0	0	0	0	0	0	0	0
Runcina divae (Marcus & Marcus, 1963)	+	0	+	0	+	+	+	0	0	0	+	0	0	0
Runcina inconspicua A. E. Verrill, 1901	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Runcina prasina (Mörch, 1863)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Scaphander bathymophila (Dall, 1881)	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Scaphander darius Marcus & Marcus, 1967	0	0	+	0	0	0	0	+	0	+	0	0	0	0
Scaphander loisae Bullis, 1956	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Scaphander nobilis A. E. Verrill, 1884	0	+	0	0	0	+	0	0	0	0	0	+	+	0
Scaphander pilsbryi McGinty, 1955	0	+	0	0	0	0	0	0	0	0	0	0	0	0
Scaphander punctostriatus (Mighels & Adams, 1842)	0	+	+	0	0	+	0	0	0	0	0	0	0	0
Scaphander watsoni Dall, 1881	+	+	+	0	0	+	0	0	0	0	0	0	0	0
Toledonia bullata (Gould, 1847)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Volvulella minuta (Bush, 1885)	+	+	+	0	0	+	0	0	0	0	0	0	0	0
Volvulella paupercula (Watson, 1883)	+	+	0	0	0	+	0	0	0	0	0	0	+	0
Volvulella persimilis (Mörch, 1875)	+	+	+	+	0	+	+	0	+	0	0	+	+	+
Volvulella recta (Mörch, 1875)	0	0	0	0	0	+	0	0	0	0	+	0	0	0
Volvulella texasiana Harry, 1967	0	+	+	0	0	0	0	0	0	0	0	0	0	0
Alderia modesta (Loven, 1844)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Aplysiopsis formosa Pruvot-Fol, 1953	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascobulla ulla (Marcus & Marcus, 1970)	+	+	+	0	0	+	+	0	+	0	+	+	0	0
Berthelinia caribbea Edmunds, 1963	+	0	+	0	0	+	0	0	+	0	0	0	0	0
Bosellia corinneae Marcus, 1973	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Bosellia marcusi Marcus, 1972	+	0	+	0	0	+	0	0	0	0	0	0	0	0

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Bosellia mimetica Trinchese, 1891	+	0	0	0	+	+	+	0	0	+	0	0	0	0
Caliphylla mediterranea A. Costa, 1867	+	0	0	0	+	+	0	0	+	0	0	+	0	0
Costasiella lilianae Marcus, 1969	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Costasiella nonatoi Marcus & Marcus, 1960	+	0	0	0	0	+	0	0	0	0	0	+	0	0
Costasiella ocellifera (Simroth, 1895)	+	0	+	0	0	+	+	0	0	0	0	+	0	0
Cyerce antillensis Engel, 1927	+	0	0	0	+	+	+	0	0	0	0	0	0	0
Cyerce cristallina (Trinchese, 1881)	+	0	0	0	+	+	+	0	0	0	0	0	0	0
Cyerce edmundsi Thompson, 1977	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Cyerce habanensis Ortea & Templado, 1989	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Elysia canguzua Marcus, 1955	+	0	0	0	0	0	0	0	0	0	0	+	0	0
Elysia catulus (Gould, 1870)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Elysia cauze Marcus, 1957	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Elysia chitwa Marcus, 1955	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Elysia chlorotica Gould, 1870	+	+	0	0	0	0	0	0	0	0	0	0	0	0
Elysia cornigera Nuttall, 1989	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Elysia eugeniae Ortea & Espinosa, 2002	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Elysia evelinae Marcus, 1957	+	0	+	0	0	0	0	0	0	0	0	+	0	0
Elysia flava A. E. Verrill, 1901	0	0	+	0	0	+	+	0	+	0	0	0	0	0
Elysia nisbeti Thompson, 1977	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Elysia ornata (Swainson, 1840)	+	0	+	0	+	+	+	0	+	0	0	0	0	0
Elysia papillosa A. E. Verrill, 1901	+	0	+	0	+	+	+	0	0	0	0	0	0	0
Elysia patagonica Muniain & Ortea, 1997	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Elysia patina Marcus, 1980	+	0	+	0	0	+	0	0	0	0	0	0	0	0
Elysia pratensis Ortea & Espinosa, 1996	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Elysia purchoni Thompson, 1977	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Elysia serca Marcus, 1955	+	+	0	0	+	+	0	0	0	0	0	+	0	0
Elysia subornata A. E. Verrill, 1901	+	0	0	0	+	+	+	0	0	0	0	+	0	0
Elysia tuca Marcus & Marcus, 1967	+	0	+	0	+	+	+	0	+	+	+	0	0	0
Elysia zuleicae Ortea & Espinosa, 2002	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Ercolania cricetus (Marcus & Marcus, 1970)	+	0	+	0	+	+	0	0	0	0	0	0	0	0
Ercolania funerea (A. Costa, 1867)	+	+	0	0	+	+	0	0	0	0	0	0	0	0
Ercolania fuscata (Gould, 1870)	+	0	0	0	+	+	0	0	0	0	0	+	0	0
Ercolania selva Ortea & Espinosa, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Hermaea bifida (Montagu, 1815)	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Hermaea coirala Marcus, 1955	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Hermaea cruciata Gould, 1870	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Lobiger souverbii Fischer, 1857	+	+	+	0	+	+	0	0	0	0	0	+	0	0
Mourgona germaineae Marcus & Marcus, 1970	+	0	+	0	0	+	0	0	0	0	0	0	0	0
Mourgona murca Marcus & Marcus, 1970	0	0	0	0	+	0	0	0	0	0	0	0	0	0
Oxynoe aguayoi Jaume, 1945	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Oxynoe antillarum Mörch, 1863	+	+	+	0	+	+	+	0	+	+	+	+	0	0
Oxynoe azuropunctata Jensen, 1980	+	0	+	0	0	+	0	0	0	0	0	0	0	0
Oxynoe panamensis Pilsbry & Olsson, 1943	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Phyllobranchillus viridis (Deshayes, 1857)	+	0	+	0	+	+	0	0	0	0	0	0	0	0
Placida dendritica (Alder & Hancock, 1843)	0	0	0	0	+	0	0	0	0	0	0	0	0	0
Placida kingstoni Thompson, 1977	+	+	+	0	0	+	0	0	0	0	0	0	0	0
Placida verticilata Ortea, 1981	+	0	+	0	0	0	0	0	0	0	0	0	0	0

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Stiliger fuscovittatus Lance, 1962	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Stiliger talis Marcus, 1856	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Stiliger vanellus (Marcus, 1957)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Stiliger vossi Marcus & Marcus, 1960	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Thuridilla mazda Ortea & Espinosa, 2000	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Thuridilla picta (A. E. Verrill, 1901)	+	0	0	0	+	+	+	0	0	0	0	0	0	0
Tridachia crispata (Mörch, 1863)	+	+	+	0	+	+	+	0	0	0	0	0	0	0
Tridachia schrammi (Mörch, 1863)	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Volvatella bermudae Clark, 1982	+	0	+	0	0	0	+	0	0	0	0	0	0	0
Akera bayeri Marcus & Marcus, 1967	+	0	+	0	0	0	0	0	+	0	0	0	0	0
Aplysia cervina (Dall & Simpson, 1901)	+	0	+	0	+	+	0	0	+	0	0	+	0	0
Aplysia dactylomela Rang, 1828	+	+	+	0	+	+	+	0	+	+	+	+	0	0
Aplysia fasciata Poiret, 1789	+	+	+	0	+	+	+	0	0	0	+	+	0	0
Aplysia geographica (Adams & Reeve, 1850)	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Aplysia juliana Quoy & Gaimard, 1832	+	0	0	0	+	+	0	0	+	0	0	+	0	0
Aplysia morio (Verrill, 1901)	+	+	0	0	0	0	+	0	0	0	0	0	0	0
Aplysia parvula Mörch, 1863	0	+	+	0	+	+	+	0	+	+	+	0	0	0
Aplysia willcoxi Heilprin, 1887	+	+	0	0	0	+	+	0	0	0	0	0	0	0
Bursatella leachii Blainville, 1817	+	+	+	0	+	+	+	0	+	+	+	+	+	0
Dolabrifera dolabrifera (Rang, 1828)	+	0	+	+	+	+	+	0	0	0	+	0	0	0
Notarchus punctatus Philippi, 1836	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Petalifera petalifera (Rang, 1828)	0	0	0	0	+	+	0	0	0	+	0	0	0	0
Petalifera ramosa Baba, 1959	+	0	+	0	0	+	0	0	0	0	0	0	0	0
Phyllaplysia engeli Marcus, 1955	+	+	+	0	+	+	0	0	+	+	0	+	0	0
Phyllaplysia smaragda Clark, 1977	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Stylocheilus citrinus (Rang, 1828)	0	0	0	0	0	0	0	0	+	0	0	+	0	0
Stylocheilus longicauda (Quoy & Gaimard, 1824)	0	0	0	0	0	+	0	0	+	0	0	+	0	0
Stylocheilus striatus (Quoy & Gaimard, 1832)	+	0	+	0	+	+	+	0	+	+	+	0	0	0
Berthella agassizii (MacFarland, 1909)	0	0	+	0	+	0	+	0	+	0	+	+	0	0
Berthella patagonica (d'Orbigny, 1835)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Berthella stellata (Risso, 1826)	+	0	+	0	0	+	0	0	+	0	+	+	0	0
Berthella tamiu Marcus, 1984	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Berthellina circularis (Mörch, 1863)	0	0	0	0	0	+	0	0	+	0	0	0	0	0
Berthellina quadridens (Mörch, 1863)	0	0	+	0	0	+	0	0	+	+	0	0	0	0
Pleurobranchaea agassizii Bergh, 1897	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Pleurobranchaea inconspicua Bergh, 1897	+	+	+	+	0	+	0	0	+	+	+	+	+	+
Pleurobranchaea obesa (Verrill, 1882)	0	+	0	0	0	+	0	0	0	0	0	0	0	0
Pleurobranchaea tarda Verrill, 1880	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Pleurobranchus areolatus Mörch, 1863	+	+	+	0	+	+	+	0	+	0	0	+	0	0
Pleurobranchus emys Marcus, 1984	0	0	+	0	0	0	0	0	+	0	0	0	0	0
Pleurobranchus evelinae Thompson, 1977	0	0	0	0	0	+	0	0	+	0	0	0	0	0
Pleurobranchus iouspi Marcus, 1984	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Pleurobranchus lacteus Dall & Simpson, 1901	0	0	0	0	+	+	0	0	0	0	0	0	0	0
Pleurobranchus niveus (Verrill, 1901)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Tylodina americana Dall, 1890	0	+	0	0	0	+	+	0	0	0	0	0	0	0
Umbraculum umbraculum (Lightfoot, 1786)	+	+	+	0	0	+	+	+	+	+	0	0	0	0
Aegires absalaoi García, Troncoso & Domínguez, 2002	0	0	0	0	0	0	0	0	+	0	0	0	0	0

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Aegires gomezi Ortea, Luque & Templado, 1990	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Aegires ortizi Templado, Luque & Ortea, 1987	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Aegires sublaevis Odhner, 1932	0	0	+	0	0	0	+	0	0	0	0	0	0	0
Ancula espinosai Ortea, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Aphelodoris antillensis Bergh, 1879	+	0	+	0	+	+	+	0	0	0	0	0	0	0
Aporodoris millegrana (Alder & Hancock, 1854)	0	0	0	0	0	0	0	0	0	0	+	0	0	0
Atagema browni Thompson, 1980	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Atagema hispida (d'Orbigny, 1837)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Atagema prea (Marcus & Marcus, 1967)	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Cadlina rumia Marcus, 1955	+	0	+	0	+	+	0	0	0	0	+	+	0	0
Cadlina scabriuscula (Bergh, 1890)	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Cadlina sparsa (Odhner, 1921)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Ceratophyllidia papilligera (Bergh, 1890)	0	+	+	0	0	+	0	+	+	0	0	0	0	0
Chromodoris binza Marcus & Marcus, 1963	0	0	0	0	+	+	0	0	0	0	+	0	0	0
Chromodoris clenchi (Russell, 1935)	+	+	+	0	0	+	+	0	+	0	+	+	0	0
Chromodoris dictya Marcus & Marcus, 1970	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Chromodoris grahami Thompson, 1980	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Chromodoris kempfi Marcus, 1971	0	0	+	0	0	0	0	0	+	0	0	0	0	0
Chromodoris neona (Marcus, 1955)	0	0	0	0	0	0	0	0	0	0	+	+	0	0
Chromodoris perola Marcus, 1976	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Chromodoris ponga Marcus & Marcus, 1970	0	0	0	0	+	0	0	0	0	0	0	0	0	0
Chromodoris punctilucens Bergh, 1890	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Chromodoris roseopicta Verrill, 1900	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Corambe evelinae Marcus, 1958	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Corambe obscura A. E. Verrill, 1870	0	+	0	0	0	+	0	0	0	0	0	+	0	0
Dendrodoris krebsii (Mörch, 1863)	+	+	+	0	+	+	0	0	0	0	+	+	0	0
Dendrodoris magagnai Ortea & Espinosa, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Dendrodoris senegalensis Bouchet 1977	0	0	0	0	0	0	0	0	+	0	0	0	0	0
Dendrodoris warta Marcus & Gallagher, 1976	+	+	0	0	0	0	0	0	0	0	0	0	0	0
Diaulula greeleyi (MacFarland, 1909)	0	0	+	0	0	+	0	0	+	+	+	+	0	0
Diaulula punctuolata (d'Orbigny, 1837)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Diaulula worki (Marcus & Marcus, 1967)	+	0	0	0	+	0	0	0	0	0	0	0	0	0
Discodoris alba White, 1952	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Discodoris branneri MacFarland, 1909	0	0	0	0	0	0	0	0	+	0	0	0	0	0
Discodoris evelinae Marcus, 1955	+	+	+	0	0	+	0	0	+	0	+	+	0	0
Discodoris mortenseni Marcus & Marcus, 1963	+	0	+	0	+	+	0	0	0	0	0	0	0	0
Discodoris muta Bergh, 1877	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Discodoris notha Bergh, 1877	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Discodoris ketos gila (Marcus & Marcus, 1970)	0	0	0	0	+	0	0	0	0	0	0	0	0	0
Discodoris phoca Marcus & Marcus, 1967	+	0	+	0	0	0	0	0	+	0	0	0	0	0
Discodoris purcina Marcus & Marcus, 1967	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Discodoris voniheringi MacFarland, 1909	0	0	0	0	0	0	0	0	+	0	0	0	0	0
Doridella carambola (Marcus, 1955)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Doriopsilla areolata nigrolineata Meyer, 1977	0	0	+	0	0	0	0	0	0	0	0	+	0	0
Doriopsilla espinosai Valdés & Ortea, 1998	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Doriopsilla pharpa Marcus, 1961	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Doris bicolor (Bergh, 1884)	+	0	0	0	0	0	0	0	0	0	0	0	0	0

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Doris bovena Marcus, 1955	0	0	0	0	+	0	0	0	0	0	0	+	0	0
Doris fontainei d'Orbigny, 1837	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Doris fretterae Thompson, 1980	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Doris ilo (Marcus, 1955)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Doris kerguelenensis (Bergh, 1884)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Doris kyolis (Marcus & Marcus, 1967)	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Doris pickensi Marcus & Marcus, 1967	0	0	0	0	0	0	0	0	0	0	+	0	0	0
Doris verrucosa Linné, 1758	+	+	+	0	0	0	0	0	+	0	+	+	0	0
Etidoris ladislavii Ihering, 1886	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Galacera marplatensis (Franceschi, 1928)	0	0	0	0	0	0	0	0	0	0	0	+	0	+
Gargamella immaculata Bergh, 1894	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Geitodoris patagonica Odhner, 1926	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Geitodoris planata (Alder y Hancock, 1846)	0	0	0	0	0	0	0	0	0	0	+	0	0	0
Geitodoris pusae (Marcus, 1955)	+	0	0	0	+	+	0	+	0	0	0	+	0	+
Geitodoris immunda Bergh, 1894	0	+	0	0	0	0	0	0	0	0	0	0	0	0
Glossodoris moerchi (Bergh, 1879)	0	+	0	0	0	+	0	0	0	0	0	0	0	0
Glossodoris sedna (Marcus & Marcus, 1967)	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Goniodoris mimula Marcus, 1955	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Hallaxa apefae Marcus, 1957	0	0	0	0	0	0	0	0	0	0	+	+	0	0
Hexabranchus morsomus Marcus & Marcus, 1962	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Holoplocamus papposus Odhner, 1926	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Hoplodoris hansrosaorum Dominguez, Garcia & Troncoso, 2006	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Hypselodoris acriba Marcus & Marcus, 1967	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Hypselodoris bayeri (Marcus & Marcus, 1967)	+	0	+	0	0	+	0	0	0	0	0	0	0	0
Hypselodoris espinosai Ortea & Valdés, 1996	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Hypselodoris lajensis Troncoso, Garcia & Urgorri, 1998	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Hypselodoris marci Marcus, 1971	0	0	+	0	0	+	0	0	0	0	+	0	0	0
Hypselodoris picta (Schultz, 1836)	+	+	0	0	0	0	0	0	0	0	0	+	0	0
Hypselodoris ruthae Marcus & Hughes, 1974	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Hypselodoris sycilla (Bergh, 1890)	+	0	+	0	0	+	0	0	+	0	0	0	0	0
Hypselodoris zebra (Heilprin, 1888)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Jorunna spazzola (Marcus, 1955)	0	0	0	0	0	+	0	0	0	+	+	+	0	0
Kankelibranchus incognitus Ortea, Espinosa & Caballer, 2005	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Lophodoris scala Marcus & Marcus, 1970	0	0	0	0	0	0	0	0	0	0	+	0	0	0
Mexichromis molloi Ortea & Valdés, 1996	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Noumea regalis Ortea, Caballer & Moro, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Okenia impexa Marcus, 1957	0	0	0	0	0	+	0	0	0	0	0	+	0	0
Okenia miramarae Ortea & Espinosa, 2000	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Okenia zoobotryon (Smallwood, 1910)	+	0	0	0	0	+	+	0	0	0	+	+	0	0
Onchidoris aureopuncta (Verrill, 1901)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Onchidoris bilamellata (Linné, 1761)	0	+	0	0	0	0	0	0	0	0	0	0	0	0
Onchidoris lactea (Verrill, 1900)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Onchidoris miniata (Verrill, 1901)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Onchidoris olivacea (Verrill, 1900)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Onchidoris quadrimaculata (Verrill, 1900)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Paradoris mulciber (Marcus, 1971)	0	0	+	0	0	0	0	0	+	0	0	0	0	0
Peltodoris crucis (Mörch, 1863)	0	0	0	0	0	+	0	0	0	0	0	0	0	0

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Peltodoris hummelincki Marcus & Marcus, 1963	0	0	+	0	+	0	0	0	0	0	0	0	0	0
Phyllidiella molaensis (Meyer, 1977)	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Platydoris angustipes (Mörch, 1863)	+	0	+	0	0	+	0	0	+	0	+	0	0	0
Plocamopherus gulo Marcus, 1979	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Plocamopherus lucayensis Hamann & Farmer, 1988	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Plocamopherus pilatectus Hamann & Farmer, 1988	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Polycera aurisula Marcus, 1957	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Polycera hedgpethi Marcus, 1964	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Polycera herthae Marcus & Marcus, 1963	0	0	0	0	+	+	0	0	0	0	0	0	0	0
Polycera hummi Abbott, 1952	+	+	0	0	0	0	0	0	0	0	0	0	0	0
Polycera japonica Baba, 1949	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Polycera manzanilloensis Ortea, Espinosa & Camacho, 1999	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Polycera odhneri Marcus, 1955	+	0	0	0	+	+	0	0	0	0	0	+	0	0
Polycera quadrilineata (Müller, 1776)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Polycera rycia Marcus & Marcus, 1970	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Polycerella emertoni Verrill, 1880	+	0	+	0	0	+	0	0	0	0	0	+	0	0
Risbecia nyalya (Marcus & Marcus, 1967)	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Rostanga byga Marcus, 1958	0	0	0	0	0	0	0	0	+	0	0	+	0	+
Rostanga pulchra MacFarland, 1905	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Sirains ilo Marcus, 1955	0	0	0	0	0	0	0	0	0	0	+	+	0	0
Sirains kyolis Marcus & Marcus, 1967	0	0	0	0	0	0	0	0	+	0	+	0	0	0
Tambja divae (Marcus, 1958)	0	0	0	0	0	0	0	0	0	0	+	0	0	0
Tambja gratiosa (Bergh, 1890)	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Tambja oliva Meyer, 1977	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Tambja stegosauriformis Pola, Cervera & Gosliner, 2005	0	0	0	0	0	0	0	0	0	0	+	0	0	0
Taringa millegrana (Alder & Hancock, 1855)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Taringa telopia Marcus, 1955	+	0	+	0	0	+	0	0	0	0	+	+	0	0
Taringa tritorquis Ortea, Pérez & Llera, 1982	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Thecacera pennigera (Montagu, 1815)	+	0	0	0	0	0	0	0	0	0	0	+	0	0
Thordisa dinda Marcus, 1955	0	0	0	0	0	+	0	0	+	0	0	+	0	0
Thordisa hurca (Marcus & Marcus, 1967)	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Trapania dalva Marcus, 1972	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Trapania maringa Marcus, 1957	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Trippa anceps (Bergh, 1890)	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Tyrinna evelinae (Marcus, 1958)	0	0	+	0	0	+	0	0	0	0	+	+	0	0
Tyrinna nobilis Bergh, 1898	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Bornella calcarata Mörch, 1863	0	0	+	+	0	+	0	0	+	0	0	0	0	0
Doto awapa Ortea, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Doto cabecar Ortea, 2001	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Doto caramella Marcus, 1957	0	0	0	0	+	0	0	0	0	0	0	+	0	0
Doto chica Marcus & Marcus, 1960	+	+	+	0	+	+	0	0	0	0	0	0	0	0
Doto curere Ortea, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Doto divae Marcus & Marcus, 1960	+	0	0	0	+	0	0	0	+	+	0	0	0	0
Doto duao Ortea, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Doto escatllari Ortea, Moro & Espinosa, 1999	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Doto iugula Ortea, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Doto kekoldi Ortea, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Doto pita Marcus, 1955	+	0	0	0	+	+	0	0	0	0	0	+	0	0
Doto proranao Ortea, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Doto pygmaea Bergh, 1871	0	0	0	0	0	+	+	0	0	0	0	0	0	0
Doto sabuli Ortea, 2001	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Doto uva Marcus, 1955	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Doto varaderoensis Ortea, 2001	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Hancockia ryrca Marcus, 1957	0	0	0	0	+	+	0	0	0	0	0	+	0	0
Lomanotus phiops Marcus, 1957	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Lomanotus vermiformis Eliot, 1908	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Marionia cucullata (Gould, 1852)	0	0	+	0	0	0	0	0	0	0	0	+	0	+
Marionia tedi Marcus, 1983	+	0	+	0	0	+	0	0	0	0	0	0	0	0
Miesea evelinae (Marcus, 1957)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Scyllaea pelagica Linné, 1758	+	+	+	0	+	+	+	0	+	0	0	0	0	0
Phylliroe atlantica Bergh, 1871	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Phylliroe bucephala Lamarck, 1816	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Tethys occidentalis (Odhner, 1936)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Tritonia australis Bergh, 1898	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Tritonia bayeri Marcus & Marcus, 1967	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Tritonia eriosi Marcus, 1983	0	0	0	0	0	0	0	0	0	0	0	0	+	+
Tritonia hamnerorum Gosliner & Ghiselin, 1987	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Tritonidoxa wellsi (Marcus, 1961)	+	0	+	0	0	0	0	0	0	0	0	+	0	0
Tritoniopsis frydis Marcus & Marcus, 1970	+	0	0	0	0	+	+	0	0	0	0	0	0	0
Armina elongata Ardila & Valdés, 2004	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Armina juliana Ardila & Díaz, 2002	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Armina muelleri (Ihering, 1886)	+	+	+	+	0	+	0	0	0	0	+	+	0	0
Janolus comis Marcus, 1955	+	0	0	0	+	0	0	0	0	0	0	+	0	0
Janolus costacubensis Ortea & Espinosa, 2000	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Janolus mucloc (Marcus, 1958)	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Anteaeolidiella indica Bergh, 1888	+	0	0	0	+	+	0	0	0	0	+	+	0	0
Aeolidia serotina Bergh, 1873	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Aeolidiella occidentalis Bergh, 1875	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Anetarca brasiliana García & Troncoso, 2004	0	0	0	0	0	0	0	0	0	0	+	0	0	0
Austraeolis catina Marcus & Marcus, 1967	+	0	0	0	0	+	0	0	0	0	0	0	0	0
Babakina festiva (Roller, 1972)	0	0	0	0	0	0	0	0	0	0	+	0	0	0
Berghia benteva (Marcus, 1958)	0	0	0	0	0	0	0	0	0	0	+	+	0	0
Berghia coerulescens (Laurillard in Cuvier, 1830)	0	0	0	0	+	+	0	0	0	0	0	0	0	0
Berghia creutzbergi Marcus & Marcus, 1970	0	0	+	0	+	+	0	0	0	0	+	0	0	0
Berghia verrucicornis (A. Costa, 1864)	+	0	+	0	0	+	0	0	0	0	0	0	0	0
Berghia rissodominguezi Muniain & Ortea, 1999	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Calmella bandeli Marcus, 1976	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Catriona maua Marcus & Marcus, 1960	+	0	0	0	+	+	0	0	0	0	0	0	0	0
Catriona oba Marcus, 1970	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Cerberilla tanna Marcus & Marcus, 1960	0	+	0	0	0	0	0	0	0	0	0	0	0	0
Cratena pilata (Gould, 1870)	+	+	0	0	0	0	+	0	0	0	0	+	0	0
Cratena piutaensis Ortea, Caballer & Espinosa, 2003	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Cuthona barbadiana Edmunds & Just, 1983	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Cuthona caerulea (Montagu, 1804)	+	0	0	0	0	0	0	0	0	0	0	+	0	0

Species	CC-CR	CR-Cro	CRo-O	O-A	ABC	WI	BER	AS	NBS	EBS	ACR	SBB	SBS	ARG
Cuthona genovae (O'Donoghue, 1929)	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Cuthona georgiana (Pfeffer, 1886)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Cuthona iris Edmunds & Just, 1983	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Cuthona perca (Marcus, 1958)	+	0	+	0	0	+	0	0	0	0	0	+	0	0
Cuthona pumilio Bergh, 1871	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Cuthona rubra (Edmunds, 1964)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Cuthona tina (Marcus, 1957)	+	0	0	0	+	+	0	0	0	0	0	+	0	0
Dondice occidentalis (Engel, 1925)	+	0	+	0	+	+	0	0	0	0	0	+	0	0
Dondice parguerensis Brandon & Cutress, 1985	0	0	0	0	0	+	+	0	0	0	0	0	0	0
Eubranchus conicla (Marcus, 1958)	+	0	+	0	0	+	0	0	0	0	0	+	0	0
Eubranchus convenientis Ortea & Caballer, 2002	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Eubranchus leopoldoi Caballer, Ortea & Espinosa, 2001	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Eubranchus toledanoi Ortea & Caballer, 2002	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Facelina agari Smallwood, 1910	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Facelina coenda Marcus, 1958	0	0	0	0	0	0	0	0	0	0	+	+	0	0
Facelina goslingii A. E. Verrill, 1901	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Facelina karonae (Marcus, 1957)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Favorinus auritulus Marcus, 1955	+	0	0	0	+	+	+	0	0	0	0	+	0	0
Fiona pinnata (Eschscholtz, 1831)	0	+	0	0	+	0	+	0	0	0	0	0	0	+
Flabellina dushia (Marcus & Marcus, 1963)	0	0	0	0	+	0	0	0	0	0	+	0	0	0
Flabellina engeli Marcus & Marcus, 1968	+	0	+	0	+	+	0	0	0	0	+	+	0	0
Flabellina hamanni Gosliner, 1994	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Flabellina marcusorum Gosliner & Kuzirian, 1990	0	0	+	0	+	0	0	0	0	0	0	+	0	0
Flabellina pallida (Verrill, 1900)	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Flabellina verta (Marcus, 1970)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Glaucus atlanticus Forster, 1777	0	+	0	0	+	+	+	0	0	0	+	+	+	0
Godiva rubrolineata Edmunds, 1964	+	0	0	0	+	+	0	0	0	0	0	+	0	0
Learchis evelinae Edmunds & Just, 1983	0	0	0	0	0	+	0	0	0	0	0	+	0	0
Learchis poica Marcus & Marcus, 1960	+	0	+	0	+	+	0	0	0	0	0	0	0	0
Limenandra nodosa Haefelfinger & Stamm, 1958	0	0	0	0	+	0	0	0	0	0	0	0	0	0
Millereolidia ritmica (Ortea, Caballer & Espinosa, 2003)	0	0	+	0	0	0	0	0	0	0	0	0	0	0
Nanuca sebastiani Marcus, 1957	0	0	+	0	+	+	0	0	0	+	0	+	0	0
Palisa kristenseni (Marcus & Marcus, 1963)	+	0	0	0	+	+	0	0	0	0	0	0	0	0
Pauleo jubatus Millen & Hamann, 1992	0	0	+	0	0	+	0	0	0	0	0	0	0	0
Phidiana lynceus Bergh, 1867	+	0	+	0	+	+	0	0	0	0	+	+	0	0
Phidiana patagonica (d'Orbigny, 1836)	0	0	0	0	0	0	0	0	0	0	0	0	0	+
Phidiana riosi García & Troncoso, 2003	0	0	0	0	0	0	0	0	+	0	0	0	0	0
Piseinotecus divae Marcus, 1955	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Pseudovermis salamandrops Marcus, 1953	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Spurilla alba (Risbec, 1928)	0	0	0	0	0	+	0	0	0	0	0	0	0	0
Spurilla neapolitana (delle Chiaje, 1844)	+	+	+	0	+	+	+	0	+	0	+	+	0	0
Tenellia adspersa (Nordmann, 1845)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Tenellia fuscata (Gould, 1870)	+	0	0	0	0	0	0	0	0	0	0	0	0	0
Tenellia pallida (Alder & Hancock, 1855)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Tergipes despectus (Johnston, 1835)	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Tergipes tergipes (Forskål, 1775)	0	0	0	0	0	0	0	0	0	0	0	+	0	0

Table 2. Limits and features of the areas considered along Brazilian coasts, based on Castro & Miranda (1998).

Regions	Coastal Limits	Width of continental shelf (Km)	Shelf-breaks depth (m)	Currents	Salinity ($^0/_{00}$)	Temperature (°C)
Amazon Shelf (AS)	4°N–2°S	125–320	140	North Brazil Current Geostrophic Current Amazon River	<33	27
Northeastern Brazilian Shelf (NBS)	2°S–8°S	40–85	73	North Brazil Current	36–37	Summer: 27–29 Winter: 26-28
Eastern Brazilian Shelf (EBS)	8°S–15°S	10–15	50–60	South Equatorial Current	36-37 River 32-33	Summer: 27–28 Winter: 25–26
Abrolhos-Campos region (ACR)	15°S–23°S	35–190	60–100	Brazil Current South Atlantic Central Water Coastal Water Upwelling events	36.5-37	Summer: 25–27 Winter: 22–24 Upwelling: 16
South Brazilian Bight (SBB)	23°S–28.4°S	50–230	120–180	Brazil Current South Atlantic Central Water Fresh Coastal Water	<33->36	Summer: 25–27 Upwelling in North:21 Winter: 20–23 Water from South <18
Southern Brazilian Shelf (SBS)	28.5°S–34°S	110–170	180	Summer: Brazil Current Winter: Subantarctic Water	Summer: >36 Winter: <34	Summer: >20 Winter: <15

Table 3. Number of species by order or suborder for each area considered.

	CC-CR	CR-Cro	CRo-O	ABC	WI	BER	O-A	AS	NBS	EBS	ACR	SBB	SBS	Arg
Cephalaspidea	50	39	52	14	88	19	8	9	26	11	14	19	14	10
Sacoglossa	38	8	29	19	37	14	0	0	7	3	3	18	0	1
Anaspidea	14	7	11	10	14	8	1	0	10	6	6	8	1	0
Notaspidea	6	5	8	3	12	5	1	1	10	4	3	5	1	2
Doridina	35	12	39	13	52	11	0	2	17	2	23	36	0	14
Dendronotina	9	2	16	6	14	5	1	0	3	1	0	8	1	3
Arminina	3	1	4	1	2	0	1	0	0	0	1	2	0	0
Aeolidina	18	5	19	19	31	10	0	0	2	1	12	26	1	5
Total	173	79	178	85	250	72	12	12	75	28	62	122	18	35

Table 4. Percentage of species from each area (vertical column) present in other localities.

	CC-CR	CR-CRo	CRo-O	ABC	WI	Ber	O-A	AS	NBS	EBS	ABR	SBB	SBS	ARG	Total of species
CC-CR	100	34	53	34	73	25	5	4	24	11	19	34	6	3	173
CR-CRo	75	100	66	30	78	39	9	8	34	15	25	37	13	8	79
CRo-O	51	29	100	24	69	21	6	5	28	12	20	25	4	3	178
ABC	69	28	51	100	80	34	2	2	27	18	28	44	5	2	85
WI	50	25	49	27	100	19	5	4	21	10	16	24	4	2	250
BER	61	43	51	40	67	100	6	6	32	17	26	26	8	4	72
O-A	67	58	83	17	100	33	100	17	50	25	42	50	33	42	12
AS	58	50	75	17	75	33	17	100	58	42	42	33	25	25	12
NBS	55	36	65	31	69	31	8	9	100	28	31	39	12	7	75
EBS	68	43	75	54	86	43	11	18	75	100	46	39	18	7	28
ABR	53	32	58	39	65	31	8	8	37	21	100	61	16	5	62
SBB	48	24	36	30	48	16	5	3	24	9	31	100	10	7	122
SBS	56	56	44	22	61	33	22	17	50	28	56	67	100	28	18
ARG	17	17	17	6	17	9	14	9	14	6	9	26	14	100	35
Total of species	173	79	178	85	250	72	12	12	75	28	62	122	18	35	